Language learning in dogs

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Abstract: Most pet dogs know a few words, but recently, the astonishing communicative skills of domestic dogs (Canis familiaris) have been discovered: Some dogs know a great number of words and differentiate objects by label in apparently humanlike ways. However, one must be careful not to overestimate the skills of man's best friend. At best, canine skills are comparable to the receptive language skills of 12– to 18-month-old infants—with grammatical skills being the most debated and questionable. One also must not underestimate their skills. Perhaps most strikingly, and in sharp contrast to other nonhuman species, from puppyhood, dogs of all breeds understand the pointing gesture.

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Language learning in Dogs
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Most pet dogs know a few words, but recently, the astonishing communicative sills of domestic dogs (*canis familiaris*) were discovered: Some dogs know a great number of words and differentiate objects by label in apparently human-like ways. However, one must be careful not to overestimate the skills of man's best friend. At best, canine skills are comparable to the receptive language skills of 12- to 18-month-old infants – with grammatical skills being the most debated and questionable. One must also not underestimate their skills. Perhaps most strikingly, and in sharp contrast to other non-human species, from puppyhood, dogs of all breeds understand the pointing gesture.

In human infancy, mastery of the pointing gesture between nine and twelve months of age is the direct precursor of referential terms in infants' vocabularies. Infant's mastery of pointing is also a milestone in early social-cognitive development: it clearly indicates the understanding of intentionality. Whether dogs, similarly to human infants, understand the communicative and the referential intentions behind human communication is subject of ongoing debate and experimentation.

Indeed, dogs seem to understand pointing slightly differently than humans. Specifically, for them pointing gestures seems to be primarily spatial directives, that is, as a command to walk in a particular direction. Mere obedience to walk in a certain direction is sufficient to "accidentally" find food or toys at a pointed-at location; understanding that the pointing gesture was *about* the food or toy is not necessary.

However, dogs seem to have some understanding of human communicative intentions. This is evident in the fact that they do not always and blindly follow pointing gestures: First, dogs follow pointing gestures only when they are is clearly directed to them and performed in a communicative manner. Second, dogs respond differently to pointing gestures depending on the context prior to the gesture and the tone of voice accompanying the gesture.

Beyond their non-verbal communication skills, most pet dogs also know at least a few words. That is, they respond appropriately to verbal commands such as "sit" and "come" "wait". Certain dogs, namely guide dogs, not only learn action commands but also labels for objects ranging from "telephone" to "streetlight" to "stairs" etc. However, guide dogs are able to acquire only a limited number of such words.

Interestingly, a few individual dogs - mostly but not exclusively Border Collies - acquired impressive vocabulary sizes and reliably differentiate several hundreds of objects by name. That is, when asked to fetch a Frisbee, ball, stick, shoe, sock, bottle, etc., these dogs bring the corresponding object – even from an adjacent room, thus with no help of a speaker's gesture or gaze. At first it was thought that such huge vocabulary skills could be found only in working dogs – but recently a Yorkshire Terrier with a vocabulary of about 200 words was identified. It is unclear what makes some dogs such successful word learners. Most dogs, even when exposed to extensive training, are unable to learn much more than a dozen words. The processes of canine word learning and the nature of the resulting lexicon are not yet understood.

Perhaps most strikingly, the linguistic dogs are able to identify the referents of novel words in ways comparable to young children. First, dogs disambiguate the reference of novel words by

relying on the speaker's pointing gesture. Second, dogs disambiguate the reference of novel words by exclusion. The latter is likely due to their general preference for one-to-one mapping between words and objects. But, the former suggests that dogs understand the unified communicative intention behind a command that comprises both a gesture and a word. Contrary to children, dogs may not appreciate the referential nature of both pointing and naming. However, they do show superficially similar behavior based on different underlying processes. For example, they might interpret the gesture plus word command as "walk in the indicated direction and you will find the object that I am asking you to fetch". Furthermore, whereas children pick up new words quickly and after minimal exposure ("fast mapping"), whether dogs also fast-map is debated.

Although the vocabularies of language-trained dogs are mostly comprised of one-to-one word-object pairs, dogs can group several objects under the same name and learn multiple terms for the same object. Such grouping does not even require explicit training; dogs extend labels spontaneously to novel exemplars. Dogs have a rudimentary understanding that words denote categories. However, in contrast to the dominant role of shape and function in human categorization, they extend labels based on a number of dimensions, including shape, texture, and material.

Much less is known about canine skills with words other than object labels, let alone grammar. Although dogs have been trained with action-schemas such as "fetch _____" and "nose _____" methodological concerns make it difficult to draw conclusions and future research is necessary to establish whether dogs understand anything about grammar.

Another poorly understood domain is the canine's ability to produce communicative signals for their human interlocutors. It is known that dogs use barking, gaze and body posture to communicate with humans and one study demonstrates a dog's use of a small number of lexigrams. Future research should address the dogs' production of communication.

In conclusion, to date, the question whether canine communicative skills differ from those of young children in degree only or more substantially remains an open one. Another open question is how these skills evolved. Dogs' marked superiority with human communication in comparison with both wolves and great apes suggests that interaction with humans during domestication played a crucial role. However, the details of the process remain to be identified by future research.

See also

Language learning in avians; Language learning in cetaceans; Language learning in non-human primates

Further readings

Grassmann, S., Kaminski, J., & Tomasello, M. (2012). How two word-trained dogs integrate pointing and naming. *Animal Cognition*, *15*(4), 657–665. doi:10.1007/s10071-012-0494-x

Ramos, D., & Ades, C. (2012). Two-Item Sentence Comprehension by a Dog (Canis familiaris). (A. Dornhaus, Hrsg.)*PLoS ONE*, *7*(2), e29689. doi:10.1371/journal.pone.0029689

Van der Zee, E., Zulch, H., & Mills, D. (2012). Word Generalization by a Dog (Canis familiaris): Is Shape Important? (A. Dornhaus, Hrsg.)*PLoS ONE*, *7*(11), e49382. doi:10.1371/journal.pone.0049382